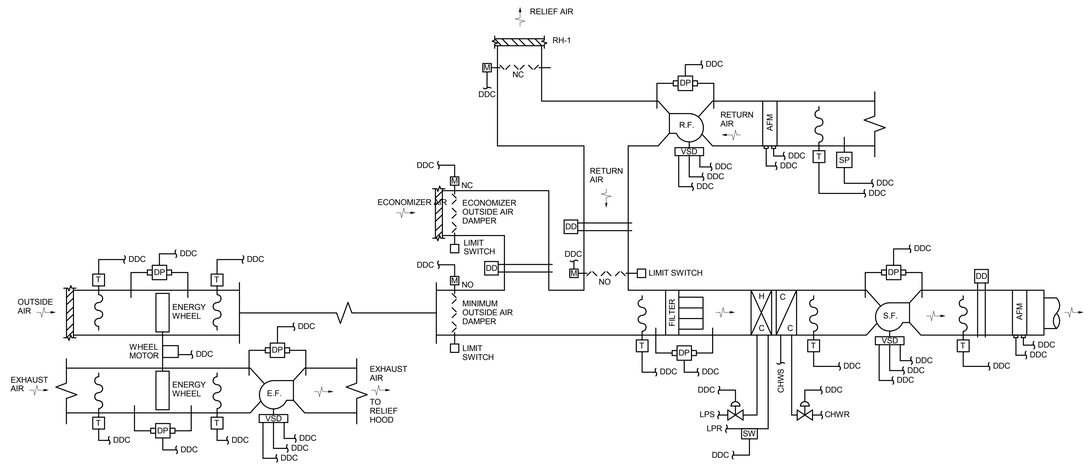


1 H801 ENERGY RECOVERY UNIT CONTROL DIAGRAM (ERU-S2, C, N2)

CONTROL SEQUENCE - SUPPLY AND RETURN FAN:

WHEN THE SUPPLY AIR FAN IS OFF, THE OUTSIDE AIR DAMPERS AND RELIEF AIR DAMPER SHALL BE CLOSED, THE RETURN AIR DAMPER SHALL BE OPEN, THE HEATING COIL CONTROL VALVE AND THE COOLING COIL CONTROL VALVE SHALL BE CLOSED TO THE COIL. THE ENERGY RECOVERY UNIT SHALL BE OFF.

LOCAL CONTROL: THE SUPPLY AIR FAN CAN BE STARTED AT THE DDC CONTROL PANEL BY INDEXING THE H-O-A SWITCH TO THE HAND POSITION. WHEN THE SUPPLY AIR FAN IS ENERGIZED, THE RETURN AIR FAN SHALL BE ENERGIZED, IF THE RETURN AIR FAN'S SWITCH IS IN THE AUTOMATIC POSITION. THE EXHAUST FAN IN THE ENERGY RECOVERY UNIT SHALL BE STARTED.

LOCAL CONTROL: THE RETURN AIR FAN CAN BE STARTED AT THE DDC CONTROL PANEL BY INDEXING THE H-O-A SWITCH TO THE HAND POSITION.

REMOTE CONTROL: THE SUPPLY AIR FAN SHALL BE PROGRAMMED TO BE STARTED OR STOPPED FROM EITHER THE LOCAL DDC CONTROL PANEL OR THE CENTRAL DDC CONTROL PANEL WHEN THE H-O-A SWITCH IS IN THE AUTOMATIC POSITION. THE SUPPLY AIR FAN SHALL ENERGIZE AND THE RETURN AIR FAN VARIABLE SPEED DRIVE SHALL BE PLACED UNDER CONTROL OF THE LOCAL DDC CONTROL PANEL. THE NORMALLY CLOSED MINIMUM OUTSIDE AIR DAMPER SHALL OPEN VIA ITS DAMPER ACTUATOR, AND THE NORMALLY CLOSED ECONOMIZER AIR DAMPER, THE NORMALLY CLOSED RELIEF AIR DAMPER, AND THE NORMALLY OPENED RETURN AIR DAMPER SHALL BE ALLOWED TO OPERATE VIA THEIR DAMPER ACTUATORS UNDER CONTROL OF THE DDC LOCAL CONTROL PANEL. IF THE SUPPLY FAN OR RETURN FAN FAILS TO START AFTER 20 SECONDS, A SOFTWARE INITIATED ALARM WILL BE SENT TO THE LOCAL DDC CONTROL PANEL AND THE CENTRAL DDC CONTROL PANEL.

CONTROL SEQUENCE - EXHAUST FAN:

LOCAL CONTROL: THE EXHAUST FAN IN THE ENERGY RECOVERY UNIT CAN BE STARTED AT THE LOCAL DDC CONTROL PANEL BY INDEXING THE H-O-A SWITCH TO THE HAND POSITION. THIS WILL FUNCTION TO FIRST OPEN THE OUTDOOR AIR DAMPER VIA DAMPER ACTUATOR. WHEN THE OUTDOOR AIR DAMPER HAS BEEN PROVEN FULL OPEN VIA LIMIT SWITCH, THE EXHAUST FAN WILL START. ONCE THE EXHAUST FAN HAS STARTED, THE ENERGY WHEEL SHALL OPERATE.

REMOTE CONTROL: THE EXHAUST FAN IN THE ENERGY RECOVERY UNIT SHALL BE PROGRAMMED TO BE STARTED OR STOPPED FROM THE LOCAL DDC CONTROL PANEL WHEN THE EXHAUST FAN H-O-A SWITCH IS IN THE AUTOMATIC POSITION. WHEN THE EXHAUST FAN START SIGNAL IS INITIATED FROM THE DDC, THE OUTDOOR AIR DAMPER WILL BE INDEXED OPEN. WHEN THE OUTDOOR AIR DAMPER HAD PROVEN FULL OPEN VIA ITS DAMPER LIMIT SWITCH, THE EXHAUST FAN WILL START. IF THE EXHAUST FAN FAILS TO START AFTER 20 SECONDS, A SOFTWARE INITIATED ALARM WILL BE SENT TO THE LOCAL DDC CONTROL PANEL AND CENTRAL DC CONTROL PANEL.

ALARM SHUTDOWN:

AN ALARM SHALL BE INITIATED AT THE LOCAL DDC AND CENTRAL DDC AT ANY TIME ANY OF THE FOLLOWING ALARM CONDITIONS ARE ACTIVATED.

FREEZE ALARM: IF FREEZING CONDITIONS ARE SENSED AT THE SENSOR LOCATED IN THE AIR STREAM ENTERING THE FILTERS, THE SUPPLY FAN SHALL SHUT DOWN, THE OUTSIDE AIR DAMPER AND RELIEF DAMPER WILL CLOSE, THE HEATING COIL VALVE WILL OPEN. THE RETURN FAN SHALL ALSO SHUTDOWN AND THE RETURN AIR DAMPERS WILL OPEN. THE EXHAUST FAN IN THE ENERGY RECOVERY UNIT SHALL SHUT DOWN.

SMOKE ALARM: IF SMOKE IS SENSED AT ANY DUCT MOUNTED SMOKE DETECTOR, THE SUPPLY FAN WILL SHUT DOWN AND ITS OUTSIDE AIR DAMPERS SHALL CLOSE. THE RETURN FAN AND EXHAUST FAN SHALL SHUT DOWN AND THE RELIEF AIR DAMPER AND RETURN AIR DAMPER SHALL CLOSE.

ALL SMOKE DAMPERS LOCATED THROUGHOUT THE SUPPLY FAN'S RESPECTIVE DUCT NETWORK AND RETURN AIR DUCT NETWORK SHALL CLOSE. ALL EXHAUST AIR FANS SERVING AREAS SERVED BY THE RESPECTIVE SUPPLY FAN SHALL SHUT DOWN. THE SMOKE DETECTORS ALARMS RESET SWITCH MUST BE INDEXED TO ITS RESET POSITION AND ALL SMOKE DAMPERS AND RETURN AIR DAMPERS MUST BE IN THE OPENED POSITION IN ORDER TO RESTART THE SUPPLY FAN, RETURN FAN, AND RESPECTIVE EXHAUST FANS.

HIGH STATIC ALARM:

IF A STATIC PRESSURE OF 0.5 IN W.G ABOVE NORMAL CONTROL AND/OR DESIGN STATIC PRESSURE EXISTS AT ANY ONE OF THE AFM STATIONS AND/OR HIGH LIMIT STATIC PRESSURE SENSORS, AN ALARM SHALL BE INITIATED AT THE LOCAL DDC CONTROL PANEL. THE SUPPLY FAN, RETURN FAN, AND EXHAUST FAN SHALL STOP.

SMOKE DAMPERS:

THE LOCAL DDC PANEL SHALL BE PROGRAMMED TO INDICATE THE POSITION OF EACH SMOKE DAMPER (OPEN OR CLOSED). IF ANY SMOKE DAMPER IS CLOSED FOR ANY REASON OTHER THAN A SMOKE CONDITION, AN ALARM SHALL BE INITIATED AT THE LOCAL DDC PANEL AND THE CENTRAL DDC PANEL.

FAN TRACKING CONTROL:

A STATIC PRESSURE SENSOR WITH ITS PROBE LOCATED IN THE DUCT 2/3 DOWNSTREAM FROM THE SUPPLY FAN, SHALL TRANSMIT A STATIC PRESSURE SIGNAL TO THE AIR HANDLING UNIT LOCAL DDC, WHICH SHALL PROVIDE A SIGNAL TO THE SUPPLY FAN'S VARIABLE SPEED DRIVE, THAT SHALL REGULATE THE SUPPLY FAN'S SPEED TO MAINTAIN 1.0 IN W.G (ADJUSTABLE) AT THE DUCT STATIC PRESSURE SENSOR.

AN AIRFLOW MEASURING STATION LOCATED IN THE RETURN AIR DUCT SHALL PROVIDE A STATIC PRESSURE INPUT SIGNAL AND TOTAL PRESSURE INPUT SIGNAL TO THE LOCAL DDC PANEL. AN AIR FLOW MEASUREMENT STATION LOCATED IN THE SUPPLY AIR DUCT SHALL ALSO PROVIDE STATIC PRESSURE INPUT SIGNALS AND TOTAL PRESSURE INPUT SIGNALS TO THE LOCAL DDC PANEL. THE LOCAL DDC PANEL SHALL CONVERT THE RETURN AIR AND SUPPLY AIR SIGNALS INTO VOLUMES (CFM), COMPARE THE TWO QUANTITIES AND SEND AN OUTPUT SIGNAL TO VARY THE SPEED OF THE RETURN FAN IN ORDER TO MAINTAIN THE VOLUME DIFFERENCE BETWEEN THE SYSTEM'S SUPPLY FAN AND RETURN FAN.

SUPPLY AIR TEMPERATURE CONTROL:

ALL TEMPERATURE SET POINTS SHALL BE CAPABLE OF BEING ADJUSTED FROM THE DDC CONTROL PANEL.

2 H801 AIR HANDLING UNIT WITH RETURN FAN CONTROL DIAGRAM (AHU-S2, C, N2)

WINTER CONDITION (BELOW 55 DEGREES OUTSIDE AIR TEMPERATURE):

THE SUPPLY, RETURN, AND EXHAUST FAN SHALL RUN CONTINUOUSLY. A TEMPERATURE SENSOR SENSING THE OUTSIDE AIR TEMPERATURE SHALL FUNCTION THROUGH ITS LOCAL DDC PANEL TO PROVIDE THE RESET FOR THE UNITS SUPPLY AIR TEMPERATURE. WHEN THE OUTSIDE AIR TEMPERATURE IS -5 DEGREES F, THE UNIT'S SUPPLY AIR TEMPERATURE SHALL BE 68 DEGREES F (ADJUSTABLE). WHEN THE OUTSIDE AIR TEMPERATURE IS 55 DEGREES F, THE UNITS SUPPLY AIR TEMPERATURE SHALL BE 55 DEGREES F (ADJUSTABLE). A SPACE TEMPERATURE SENSOR PROVIDING A SIGNAL TO THE LOCAL DDC PANEL SHALL BE CAPABLE OF MODIFYING THE INDOOR/OUTDOOR RESET SCHEDULE WHEN SPACE TEMPERATURE CONDITIONS ARE SATISFIED.

THE UNIT'S SUPPLY AIR RESET TEMPERATURE SCHEDULE SHALL BE MAINTAINED VIA THE LOCAL DDC PANEL BY MODULATING THE UNIT'S OUTSIDE AIR DAMPER AND RETURN AIR DAMPER ALONG WITH THE HEATING COIL VALVE ON A DROP IN TEMPERATURE. THE SENSOR SHALL FIRST FUNCTION TO MODULATE THE OUTSIDE AIR DAMPER AND RELIEF DAMPER CLOSED TO MINIMUM CFM AND THE RETURN AIR DAMPER OPEN. ON A FURTHER DROP IN TEMPERATURE THE HOT WATER COIL VALVE SHALL MODULATE OPEN TO MAINTAIN THE DISCHARGE TEMPERATURE RESET SCHEDULE. ON A RISE IN TEMPERATURE, THE REVERSE SHALL OCCUR.

WHEN THE AIR TEMPERATURE IS BELOW THE SETTING OF THE OUTSIDE AIR TEMPERATURE SENSOR (55 DEGREES F ADJUSTABLE) AND WHEN THE DISCHARGE AIR TEMPERATURE IS ON A CALL FOR COOLING AS DETERMINED BY THE TEMPERATURE SENSOR REGULATED BY ITS RESET SCHEDULE THE OUTSIDE AIR DAMPER, RETURN AIR DAMPER, AND RELIEF AIR DAMPER SHALL BE ALLOWED TO OPERATE IN UNISON TO MAINTAIN A MIXED AIR TEMPERATURE OF NO LESS THAN 55 DEGREES F AS DETERMINED BY THE MIXED AIR TEMPERATURE SENSOR SET TO CONTROL T 55 DEGREES F (ADJUSTABLE). THE OUTSIDE AIR DAMPER SHALL NOT CLOSE BEYOND ITS MINIMUM CFM SET POINT.

SUMMER CONDITION (ABOVE 55 DEGREES F OUTSIDE AIR TEMPERATURE:

THE UNIT'S OUTSIDE AIR TEMPERATURE SENSOR SHALL FUNCTION THROUGH ITS LOCAL DDC PANEL TO CLOSE THE HEATING COIL CONTROL VALVE WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE 55 DEGREES F (ADJUSTABLE).

OCCUPIED CYCLE:

THE SUPPLY, RETURN, AND EXHAUST FANS SHALL OPERATE CONTINUOUSLY.

A TEMPERATURE SENSOR SENSING THE UNIT'S SUPPLY AIR TEMPERATURE SHALL FUNCTION THROUGH ITS LOCAL DDC CONTROL PANEL TO MODULATE THE UNIT'S COOLING COIL VALVE TO MAINTAIN THE UNIT'S SUPPLY AIR TEMPERATURE OF 55 DEGREES F.

THE MINIMUM OUTSIDE AIR, RETURN AIR, AND RELIEF AIR DAMPERS SHALL BE UNDER CONTROL OF THE LOCAL DDC CONTROL PANEL ENTHALPY CONTROL. THE ECONOMIZER OUTSIDE AIR DAMPER SHALL BE CLOSED. THE HEATING COIL CONTROL VALVE SHALL BE CLOSED.

UNOCCUPIED CYCLE:

WHEN THE LOCAL DDC PANEL'S PROGRAM THE UNIT TO THE UNPOCCUPIED CYCLE, THE SUPPLY AND RETURN FANS SHALL BE 'OFF' AND UNDER CONTROL OF THE SPACE TEMPERATURE SENSOR. THE OUTSIDE AIR DAMPERS AND RELIEF AIR DAMPER SHALL REMAIN CLOSED AND THE RETURN AIR DAMPER SHALL BE OPEN DURING THE UNOCCUPIED CYCLE. THE SPACE TEMPERATURE SENSOR SHALL CYCLE THE SUPPLY AND RETURN AIR FANS AND MODULATE THE HEATING COIL CONTROL VALVE TO MAINTAIN THE REDUCED NIGHT TEMPERATURE. SUPPLY AND RETURN FAN SPEED SHALL BE UNDER CONTROL OF THE DDC'S AIR VOLUME CONTROL SEQUENCE. THE UNOCCUPIED ZONE SPACE TEMPERATURE SENSOR SET POINT SHALL BE SET 2 DEGREES F (ADJUSTABLE) BELOW ANY OF THE ZONE THERMOSTAT'S SET POINTS.

WARM-UP CYCLE:

WHEN THE AIR HANDLING SYSTEM IS FIRST RESTORED TO THE OCCUPIED CYCLE FROM THE UNOCCUPIED MODE, THE OUTSIDE AIR DAMPERS AND RELIEF AIR DAMPER SHALL REMAIN CLOSED AND THE RETURN AIR DAMPER SHALL REMAIN OPEN. THE OCCUPIED CYCLE SEQUENCE SHALL BE UNDER CONTROL OF THE AIR HANDLING UNIT'S RESPECTIVE SPACE TEMPERATURE SENSOR UNTIL THE SPACE TEMPERATURE OF ANY ONE SPACE SENSOR IS WITHIN 1 DEGREE F OF THE OCCUPIED CYCLE SET POINT. AT THAT TIME, THE SEQUENCE WILL RETURN TO BE UNDER CONTROL OF THE OCCUPIED CYCLE.

ENTHALPY CONTROL ECONOMIZER:

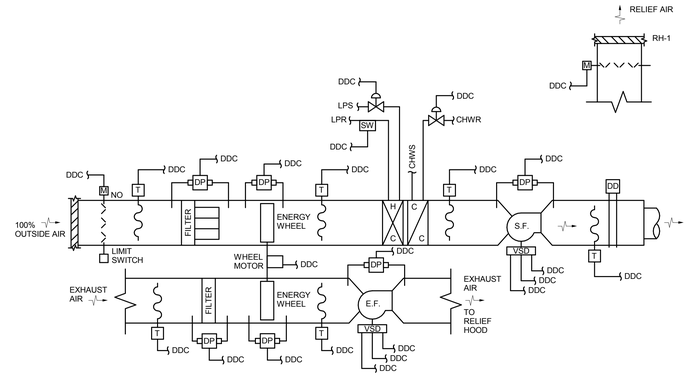
WHEN THE OUTSIDE TEMPERATURE RISES ABOVE THE SETTING OF THE OUTSIDE AIR SENSOR (55 DEGREES F ADJUSTABLE), THE ECONOMIZER OUTSIDE AIR DAMPER AND RELIEF AIR DAMPER SHALL BE MODULATED ACCORDING TO AN ENTHALPY CONTROL SYSTEM SET UP THROUGH THE DDC CONTROL PANEL. ONCE THE ECONOMIZER AIR DAMPER OPENS TO 15%, THE MINIMUM OUTSIDE AIR DAMPER SHALL CLOSE. THE DDC CONTROL PANEL SHALL USE HUMIDITY SENSOR AND DRY BULB TEMPERATURE SENSOR PAIRS TO DETERMINE THE TOTAL HEAT CONTENT OF THE OUTDOOR AIR AND THE RETURN AIR. SELECT THE SENSOR WITH THE LOWER TOTAL HEAT CONTENT AND MODULATE THE ECONOMIZER OUTSIDE, RETURN, AND RELIEF AIR DAMPERS IN UNISON TO MAINTAIN A TEMPERATURE WITH THE LOWEST POSSIBLE HEAT CONTENT IN THE MIXED AIR PLENUM. ONCE THE ECONOMIZER AIR DAMPER CLOSES TO 85% CLOSED, THE MINIMUM OUTDOOR AIR DAMPER SHALL OPEN AND THE ECONOMIZER AIR DAMPER SHALL CLOSE.

ENERGY RECOVERY WHEEL CONTROL:

LOCAL CONTROL: THE ENERGY RECOVERY UNIT SHALL BE CAPABLE OF BEING STARTED FROM THE H-O-A SWITCH LOCATED AT THE UNIT'S LOCAL DDC PANEL WHEN THE H-O-A SWITCH IS IN THE HAND POSITION.

REMOTE CONTROL: THE ENERGY RECOVERY UNIT SHALL BE CAPABLE OF BEING STARTED OR STOPPED FROM THE UNIT'S LOCAL DDC PANEL WHEN THE H-O-A SWITCH IS IN THE AUTOMATIC POSITION.

SEQUENCE OF CONTROL: THE ENERGY RECOVERY UNIT SHALL OPERATE CONTINUOUSLY WHENEVER ITS RESPECTIVE AHU SUPPLY AIR FAN IS IN OPERATING MODE, AND WHEN THE OUTSIDE AIR TEMPERATURE DOES NOT CAUSE THE SYSTEM TO BE IN ECONOMIZER MODE.



3 H801 VENTILATION AIR UNIT CONTROL DIAGRAM (AHU-S1, N1)

CONTROL SEQUENCE - SUPPLY AND EXHAUST FAN:

WHEN THE SUPPLY AIR FAN IS OFF, THE OUTSIDE AIR DAMPER SHALL BE CLOSED. THE HEATING COIL CONTROL VALVE AND THE COOLING COIL CONTROL VALVE SHALL BE CLOSED TO THE COIL. THE EXHAUST FAN AND ENERGY RECOVERY WHEEL SHALL BE OFF.

LOCAL CONTROL: THE SUPPLY AIR FAN CAN BE STARTED AT THE DDC CONTROL PANEL BY INDEXING THE H-O-A SWITCH TO THE HAND POSITION. WHEN THE SUPPLY AIR FAN IS ENERGIZED, THE EXHAUST AIR FAN SHALL BE ENERGIZED.

REMOTE CONTROL: THE SUPPLY AIR FAN SHALL BE PROGRAMMED TO BE STARTED OR STOPPED FROM EITHER THE LOCAL DDC CONTROL PANEL OR THE CENTRAL DDC CONTROL PANEL WHEN THE H-O-A SWITCH IS IN THE AUTOMATIC POSITION. THE SUPPLY AIR FAN SHALL ENERGIZE AND THE EXHAUST AIR FAN SHALL BE PLACED UNDER CONTROL OF THE LOCAL DDC CONTROL PANEL. THE NORMALLY CLOSED OUTSIDE AIR DAMPER SHALL OPEN VIA ITS DAMPER ACTUATOR, AND BE ALLOWED TO OPERATE VIA THE DAMPER ACTUATOR UNDER CONTROL OF THE DDC LOCAL CONTROL PANEL. IF THE SUPPLY FAN OR EXHAUST FAN FAILS TO START AFTER 20 SECONDS, A SOFTWARE INITIATED ALARM WILL BE SENT TO THE LOCAL DDC CONTROL PANEL AND THE CENTRAL DDC CONTROL PANEL.

CONTROL SEQUENCE - EXHAUST FAN:

LOCAL CONTROL: THE EXHAUST FAN CAN BE STARTED AT THE LOCAL DDC CONTROL PANEL BY INDEXING THE H-O-A SWITCH TO THE HAND POSITION. THIS WILL FUNCTION TO FIRST OPEN THE OUTDOOR AIR DAMPER VIA DAMPER ACTUATOR. WHEN THE OUTDOOR AIR DAMPER HAS BEEN PROVEN FULL OPEN VIA LIMIT SWITCH, THE EXHAUST FAN WILL START. ONCE THE EXHAUST FAN HAS STARTED, THE SUPPLY FAN SHALL START, AND THE ENERGY WHEEL SHALL OPERATE.

REMOTE CONTROL: THE EXHAUST FAN SHALL BE PROGRAMMED TO BE STARTED OR STOPPED FROM THE LOCAL DDC CONTROL PANEL WHEN THE EXHAUST FAN H-O-A SWITCH IS IN THE AUTOMATIC POSITION. WHEN THE EXHAUST FAN START SIGNAL IS INITIATED FROM THE DDC, THE OUTDOOR AIR DAMPER WILL BE INDEXED OPEN. WHEN THE OUTDOOR AIR DAMPER HAD PROVEN FULL OPEN VIA ITS DAMPER LIMIT SWITCH, THE EXHAUST FAN WILL START. IF THE EXHAUST FAN FAILS TO START AFTER 20 SECONDS, A SOFTWARE INITIATED ALARM WILL BE SENT TO THE LOCAL DDC CONTROL PANEL AND CENTRAL DC CONTROL PANEL.

ALARM SHUTDOWN:

AN ALARM SHALL BE INITIATED AT THE LOCAL DDC AND CENTRAL DDC AT ANY TIME ANY OF THE FOLLOWING ALARM CONDITIONS ARE ACTIVATED.

FREEZE ALARM: IF FREEZING CONDITIONS ARE SENSED AT THE SENSOR LOCATED IN THE AIR STREAM ENTERING THE HEATING COIL, THE SUPPLY FAN SHALL SHUT DOWN, THE OUTSIDE AIR DAMPER WILL CLOSE, THE HEATING COIL VALVE WILL OPEN. THE EXHAUST FAN SHALL ALSO SHUTDOWN.

SMOKE ALARM: IF SMOKE IS SENSED AT ANY DUCT MOUNTED SMOKE DETECTOR, THE SUPPLY FAN WILL SHUT DOWN AND ITS OUTSIDE AIR DAMPERS SHALL CLOSE. THE EXHAUST FAN SHALL SHUT DOWN.

ALL SMOKE DAMPERS LOCATED THROUGHOUT THE SUPPLY FAN'S RESPECTIVE DUCT NETWORK AND EXHAUST AIR DUCT NETWORK SHALL CLOSE. ALL EXHAUST AIR FANS SERVING AREAS SERVED BY THE RESPECTIVE SUPPLY FAN SHALL SHUT DOWN. THE SMOKE DETECTORS ALARMS RESET SWITCH MUST BE INDEXED TO ITS RESET POSITION AND ALL SMOKE DAMPERS MUST BE IN THE OPENED POSITION IN ORDER TO RESTART THE SUPPLY FAN OR EXHAUST FANS.

HIGH STATIC ALARM:

IF A STATIC PRESSURE OF 0.5 IN W.G ABOVE NORMAL CONTROL AND/OR DESIGN STATIC PRESSURE EXISTS AT ANY ONE OF THE AFM STATIONS AND/OR HIGH LIMIT STATIC PRESSURE SENSORS, AN ALARM SHALL BE INITIATED AT THE LOCAL DDC CONTROL PANEL. THE SUPPLY FAN AND EXHAUST FAN SHALL STOP.

SMOKE DAMPERS:

THE LOCAL DDC PANEL SHALL BE PROGRAMMED TO INDICATE THE POSITION OF EACH SMOKE DAMPER (OPEN OR CLOSED). IF ANY SMOKE DAMPER IS CLOSED FOR ANY REASON OTHER THAN A SMOKE CONDITION, AN ALARM SHALL BE INITIATED AT THE LOCAL DDC PANEL AND THE CENTRAL DDC PANEL.

FAN TRACKING CONTROL:

A STATIC PRESSURE SENSOR WITH ITS PROBE LOCATED IN THE DUCT 2/3 DOWNSTREAM FROM THE SUPPLY FAN, SHALL TRANSMIT A STATIC PRESSURE SIGNAL TO THE AIR HANDLING UNIT LOCAL DDC, WHICH SHALL PROVIDE A SIGNAL TO THE SUPPLY FAN'S VARIABLE SPEED DRIVE, THAT SHALL REGULATE THE SUPPLY FAN'S SPEED TO MAINTAIN 1.0 IN W.G (ADJUSTABLE) AT THE DUCT STATIC PRESSURE SENSOR.

SUPPLY AIR TEMPERATURE CONTROL:

ALL TEMPERATURE SET POINTS SHALL BE CAPABLE OF BEING ADJUSTED FROM THE DDC CONTROL PANEL.

WINTER CONDITION (BELOW 55 DEGREES OUTSIDE AIR TEMPERATURE):

THE SUPPLY AND EXHAUST FANS SHALL RUN CONTINUOUSLY. A TEMPERATURE SENSOR SENSING THE OUTSIDE AIR TEMPERATURE SHALL FUNCTION THROUGH ITS LOCAL DDC PANEL TO PROVIDE THE RESET FOR THE UNITS SUPPLY AIR TEMPERATURE. WHEN THE OUTSIDE AIR TEMPERATURE IS -5 DEGREES F, THE UNIT'S SUPPLY AIR TEMPERATURE SHALL BE 68 DEGREES F (ADJUSTABLE). WHEN THE OUTSIDE AIR TEMPERATURE IS 55 DEGREES F, THE UNITS SUPPLY AIR TEMPERATURE SHALL BE 55 DEGREES F (ADJUSTABLE). A SPACE TEMPERATURE SENSOR PROVIDING A SIGNAL TO THE LOCAL DDC PANEL SHALL BE CAPABLE OF MODIFYING THE INDOOR/OUTDOOR RESET SCHEDULE WHEN SPACE TEMPERATURE CONDITIONS ARE SATISFIED.

THE UNIT'S SUPPLY AIR RESET TEMPERATURE SCHEDULE SHALL BE MAINTAINED VIA THE LOCAL DDC PANEL BY MODULATING THE UNIT'S HEATING COIL VALVE. ON A DROP IN TEMPERATURE, THE SENSOR SHALL FUNCTION TO MODULATE OPEN THE HOT WATER CONTROL VALVE TO MAINTAIN THE DISCHARGE TEMPERATURE RESET SCHEDULE. ON A RISE IN TEMPERATURE, THE REVERSE SHALL OCCUR.

WHEN THE AIR TEMPERATURE IS BELOW THE SETTING OF THE OUTSIDE AIR TEMPERATURE SENSOR (55 DEGREES F ADJUSTABLE) AND WHEN THE DISCHARGE AIR TEMPERATURE IS ON A CALL FOR COOLING AS DETERMINED BY THE TEMPERATURE SENSOR REGULATED BY ITS RESET SCHEDULE, THE AIR HANDLING UNIT SHALL BE ALLOWED TO OPERATE TO MAINTAIN A SUPPLY AIR TEMPERATURE OF NO LESS THAN 55 DEGREES F AS DETERMINED BY AIR TEMPERATURE SENSOR SET TO CONTROL T 55 DEGREES F (ADJUSTABLE).

SUMMER CONDITION (ABOVE 55 DEGREES F OUTSIDE AIR TEMPERATURE:

THE UNIT'S OUTSIDE AIR TEMPERATURE SENSOR SHALL FUNCTION THROUGH ITS LOCAL DDC PANEL TO CLOSE THE HEATING COIL CONTROL VALVE WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE 55 DEGREES F (ADJUSTABLE).

OCCUPIED CYCLE:

THE SUPPLY AND EXHAUST FANS SHALL OPERATE CONTINUOUSLY.

A TEMPERATURE SENSOR SENSING THE UNIT'S SUPPLY AIR TEMPERATURE SHALL FUNCTION THROUGH ITS LOCAL DDC CONTROL PANEL TO MODULATE THE UNIT'S COOLING COIL VALVE TO MAINTAIN THE UNIT'S SUPPLY AIR TEMPERATURE OF 55 DEGREES F.

THE OUTSIDE AIR DAMPER SHALL BE UNDER CONTROL OF THE LOCAL DDC CONTROL PANEL. THE HEATING AND COOLING CONTROL VALVES SHALL BE CLOSED AND SHALL FUNCTION THROUGH ITS LOCAL DDC CONTROL PANEL.

UNOCCUPIED CYCLE:

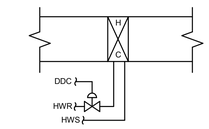
WHEN THE LOCAL DDC PANEL PROGRAMS THE UNIT TO THE UNPOCCUPIED CYCLE, THE SUPPLY AND EXHAUST FANS SHALL BE 'OFF' AND UNDER CONTROL OF THE SPACE TEMPERATURE SENSOR. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED DURING THE UNOCCUPIED CYCLE. THE SPACE TEMPERATURE SENSOR SHALL CYCLE THE SUPPLY AND EXHAUST AIR FANS AND MODULATE THE HEATING COIL CONTROL VALVE TO MAINTAIN THE REDUCED NIGHT TEMPERATURE. SUPPLY AND EXHAUST FAN SPEED SHALL BE UNDER CONTROL OF THE DDC'S AIR VOLUME CONTROL SEQUENCE. THE UNOCCUPIED ZONE SPACE TEMPERATURE SENSOR SET POINT SHALL BE SET 2 DEGREES F (ADJUSTABLE) BELOW ANY OF THE ZONE THERMOSTAT'S SET POINTS.

WARM-UP CYCLE:

WHEN THE AIR HANDLING SYSTEM IS FIRST RESTORED TO THE OCCUPIED CYCLE FROM THE UNOCCUPIED MODE, THE OUTSIDE AIR DAMPER SHALL OPEN. THE OCCUPIED CYCLE SEQUENCE SHALL BE UNDER CONTROL OF THE AIR HANDLING UNIT'S RESPECTIVE SPACE TEMPERATURE SENSOR UNTIL THE SPACE TEMPERATURE OF ANY ONE SPACE SENSOR IS WITHIN 1 DEGREE F OF THE OCCUPIED CYCLE SET POINT. AT THAT TIME, THE SEQUENCE WILL RETURN TO BE UNDER CONTROL OF THE OCCUPIED CYCLE.

ENERGY RECOVERY WHEEL CONTROL:

SEQUENCE OF CONTROL: THE ENERGY RECOVERY WHEEL SHALL OPERATE CONTINUOUSLY WHENEVER THE EXHAUST AND SUPPLY FANS ARE IN OPERATING MODE.



NOTE: NEW 2-WAY CONTROL VALVE TO HAVE ELECTRIC ACTUATOR AND WIRED TO NEW BUILDING DDC SYSTEM.

4 H801 HEATING COIL VALVE REPLACEMENT CONTROL DIAGRAM (RH-3,4,5,6,8)

CONTROL DIAGRAM ABBREVIATIONS:

AFM	AIRFLOW MEASUREMENT STATION
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
DD	DUCT MOUNTED SMOKE DETECTOR
DDC	DIRECT DIGITAL CONTROLS (WIRE TO PANEL)
DP	DIFFERENTIAL PRESSURE
EF	EXHAUST FAN
H	HUMIDITY SENSOR
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
M	MOTOR OPERATOR
MPCR	MEDIUM PRESSURE CONDENSATE RETURN
MPS	MEDIUM PRESSURE STEAM
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
SF	SUPPLY FAN
SP	STATIC PRESSURE
SW	TEMPERATURE SWITCH
T	TEMPERATURE SENSOR
VSD	VARIABLE SPEED DRIVE

FULLY SPRINKLERED
BID DOCUMENTS

Revisions:	Date

CONSULTANTS:

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Drawing Title: HVAC CONTROL DIAGRAMS

Approved: Project Director

Project Title: BUILDING 9 - SECOND FLOOR RENOVATION

Location: 1400 Blackhorse Hill Road Coatesville, PA 19320

Date	Checked	Drawn
05 / 12 / 14	SPL	SPL

Project Number: 542-13-105

Building Number: 9

Drawing Number: H801

Dwg. 96 **of** 125

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

three inches = one foot
one and one half inch = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
three eighths inch = one foot
one quarter inch = one foot
one eighth inch = one foot